



# Exponent®

Engineering & Scientific Consulting

## Kate Cheng, Ph.D., P.E.

Managing Engineer | Mechanical Engineering

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## Professional Profile

Dr. Cheng specializes in computational mechanics and analytical modeling of metal deformation and manufacturing processes. She has experience in thermal and mechanical finite element modeling (FEA) of plasticity, damage, and microstructure evolution.

At Exponent, Dr. Cheng performs analysis of mechanical components and software. She has analyzed technologies involved in intellectual property disputes regarding consumer products and machinery with mechanical and electronic components, including equipment used in energy generation. She has performed failure investigations related to manufacturing defects and damage in consumer products and industrial equipment.

Prior to joining Exponent, Dr. Cheng completed her Ph.D. at Northwestern University on toolpath design and optimization for metal 3D printing and incremental sheet metal forming. During her studies, she also performed research in collaboration with Ford Motor Company to develop software for modeling the deformation and failure of carbon fiber composites. She has experience in data analysis, parallel and high-performance computing, image processing, data visualization, data acquisition, and experiment design.

## Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Northwestern University, 2020

M.S., Mechanical Engineering, Northwestern University, 2017

B.S., Mechanical Engineering, California Institute of Technology (Caltech), 2014

## Licenses and Certifications

Professional Engineer, Illinois, #062074128

## Prior Experience

Guest Researcher, National Institute for Standards and Technology, 2020

## Professional Affiliations

American Society for Testing and Materials (ASTM)

Society of Woman Engineers (SWE)

## Languages

Cantonese Chinese

## Publications

Cheng P, Liu WK, Ehmann K, Cao J. Enumeration of additive manufacturing toolpaths using Hamiltonian paths. *Manufacturing Letters*. 2020; 26:29-32.

Cheng P. Toolpath Design for Additive Manufacturing Using Graph Theory. Ph. D. Dissertation, Northwestern University, 2020.

Ndip-Agbor E, Cheng P, Moser N, Ehmann K, Cao J. Prediction of rigid body motion in multi-pass single point incremental forming. *Journal of Materials processing Technology*. 2019 Jul 1;269:117-27.

Smith J, Xiong W, Yan W, Lin S, Cheng P, Kafka OL, Wagner GJ, Cao J, Liu WK. Linking process, structure, property, and performance for metal-based additive manufacturing: computational approaches with experimental support. *Computational Mechanics*. 2016 Apr 1;57(4):583-610.

## Additional Education & Training

Certificate in Research Communication, Northwestern University

Management for Scientists and Engineers Certificate, Northwestern University

Predictive Science & Engineering Design Certificate, Northwestern University

SWE/Chevron Scholar